# 倉庫害蟲藥劑防治試驗（二）[1]

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## 一、前　言

本省積穀害蟲之防治，可分空倉處理，即預先將潛伏在空倉中之害蟲消滅。繼而新進倉之積穀混拌藥劑以防害蟲之發生。本試驗係接受麒麟公司之委託，以試驗毒性較低之Gardona，為空倉處理藥劑，自民國五十九（1970）年至六十年二月在臺北進行室內試驗，玆將結果報告於次，以供推廣防治積穀害蟲之參考。

## 二、試驗材料及方法

供試藥劑：（1）75% Gardona W. P.（2—chloro—1—（2,4,5—trichlorophenyl) Vinyl dimethyl phosphate）係英國 Shell 公司出品。（2）50%Cythion W. P.（s—（1,2—diethoxy-cardonylethyl）—0,0—dimethyl dithiophosphate）美國 Cyanamid 公司出品，以後者作為標準劑，其使用濃度各稀釋為 1 %及0.5%。

供試昆蟲：有穀象（*Sitophilus oryzae* L.,）、穀蠹（*Rhizopertha dominica* F.,）、擬穀盜（*Tribolium castaneum* H.,）等成蟲三種，除室內飼育繁殖者外，並自臺中縣沙鹿鎮洽益粉料廠碎麥中採得者作為供試材料。

試驗方法：處理方法有三，（一）濾紙浸藥法；以直徑 10cm 濾紙放入玻璃燒杯內之各處理稀釋藥液中浸濕後，即刻取出，放於玻璃皿之蓋及底兩面內。（二）箱板敷水泥噴藥法；用長方形小木箱內壁面積之總和為 920cm$^2$，其六面均能活動裝卸，於內壁各面敷上一層厚約 3mm 左右光面水泥，俟陰乾後噴藥處理。（三）蔴袋噴藥法；利用裝穀之蔴袋縫製15.2×30.3cm小蔴袋之面積共為92cm$^2$。依120c.c./m$^2$ 使用藥量，以小型噴霧器噴佈於木箱內壁及蔴袋兩面上，另以清水噴佈作為對照，待陰乾後，將各面木板聚合成木箱，用橡皮帶束緊。玻璃皿內濾紙上及木箱內放入上列三種害蟲，各50頭，任其自由爬行接觸，經48、72、96小時後，將不能行動之害蟲撥出，於放大鏡下檢查，視其觸角或足能動者列入活蟲，再放入培養皿及木箱內繼續接觸。蔴袋噴藥處理者則裝入稻穀 1 公斤，袋口捆緊，存於常溫室內，每隔 1 月於各種處理取三袋埋存於有害蟲繁殖之木箱稻穀中，經 1 月後取出，進行檢查附着蔴袋表面與侵入袋內之害蟲種類，生存及死亡蟲數。

## 三、試　驗　結　果

表 1．濾紙浸藥對積穀害蟲之毒效試驗

| 藥劑 | 濃度 有機成分 (%) | 供試蟲數 | | | 接觸時間與死亡率 (%) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 48小時 | | | 72小時 | | | 96小時 | | |
| | | *Sitophiusl oryzae* | *Rhizopertha dominica* | *Tribolium castaneum* | *Sitophilus oryzae* | *Rhizopertha dominica* | *Tribolium castaneum* | *Sitophilus cryzae* | *Rhizopertha dominica* | *Tribolium castaneum* | *Sitophilus oryzae* | *Rhizopertha dominica* | *Tribolium castaneum* |
| 75% Gardona W. P. | 1.0 | 50 | 50 | 50 | 3.3 | 28.0 | 34.0 | 74.7 | 86.0 | 94.0 | 97.3 | 95.3 | 98.0 |
| | 0.5 | 50 | 50 | 50 | 2.7 | 16.7 | 11.3 | 77.7 | 85.3 | 86.7 | 94.7 | 93.3 | 97.3 |
| 50% Cythion W, P. | 1.0 | 50 | 50 | 50 | 2.7 | 17.3 | 19.3 | 80.6 | 83.3 | 92.0 | 97,3 | 93.3 | 99.3 |
| | 0.5 | 50 | 50 | 50 | 2.0 | 9.3 | 20.7 | 70.0 | 70.7 | 88.7 | 96.0 | 90.3 | 96.7 |
| Check | — | 50 | 50 | 50 | 0 | 1.3 | 3.3 | 0 | 1.3 | 3.3 | 0.7 | 2.0 | 3.3 |
| (L. S. D. ) | | | | 5% | 2.8 | 9.1 | 6.7 | 9.8 | 22.4 | 7.2 | 2.9 | 7.8 | 3.9 |
| | | | | 1% | 4.1 | 13.3 | 9.7 | 14.4 | 32.6 | 106 | 4.4 | 11.4 | 5.7 |

1.試驗報告農試字第五五〇號　　2.臺灣省農業試驗所技佐

## 表 2. 木箱內水泥面上噴佈藥液對積穀害蟲之毒效試驗

| 藥劑 | 濃度有機成分(%) | 供試蟲數 | | | 接觸時間與死亡率(%) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 48 小時 | | | 72 小時 | | | 96 小時 | | |
| | | *Sitophilus oryzae* | *Rhizopertha dominica* | *Tribolium castaneum* | *Sitophilus oryzae* | *Rhizopertha dominica* | *Tribolium castaneum* | *Sitophilus oryzae* | *Rhizopertha dominica* | *Tribolium castaneum* | *Sitophilus oryzae* | *Rhizopertha dominica* | *Tribolium castaneum* |
| 75% Gardona W. P. | 1.0 | 47 | 47 | 47 | 80.2 | 56.0 | 90.0 | 98.0 | 80.6 | 97.5 | 100.0 | 98.0 | 100.0 |
| | 0.5 | 46 | 48 | 48 | 71.4 | 46.0 | 83.1 | 95.0 | 81.5 | 98.1 | 100.0 | 96.5 | 100.0 |
| 50% Cythion W. P. | 1.0 | 44 | 47 | 47 | 12.0 | 17.0 | 5.6 | 25.6 | 36.1 | 25.0 | 56.3 | 44.5 | 41.6 |
| | 0.5 | 47 | 47 | 44 | 7.1 | 12.5 | 2.1 | 14.8 | 28.5 | 16.0 | 35.2 | 37.7 | 23.4 |
| Check | — | 47 | 47 | 45 | 2.0 | 0.7 | 0 | 5.0 | 1.4 | 1.4 | 6.4 | 4.3 | 3.0 |
| (L. S. D.) | | | | 5% | 7.5 | 14.2 | 11.0 | 4.7 | 6.9 | 15.5 | 3.9 | 7.7 | 8.2 |
| | | | | 1% | 10.9 | 20.7 | 16.0 | 6.8 | 10.0 | 22.6 | 5.7 | 11.1 | 12.0 |

## 表 3. 麻袋表面噴佈藥液對積穀害蟲之毒效試驗

| 藥劑 | 濃度有機成分(%) | 經過期間(月) | 害蟲種類(頭) | | | | | | | | | | | | 合計 | | 總計 | 活蟲率(%) | 活蟲率指數 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Rhizopertha dominica* | | *Sitophilus oryzae* | | *Tribolium castaneum* | | *Lophocateres pusillus* | | *Laemophloeus ferrugineus* | | *Oryzaephilus surinamersis* | | | | | | |
| | | | D | A | D | A | D | A | D | A | D | A | D | A | D | A | | | |
| 75% Gardona W. P. | 1.0 | 0 | 18.7* | 0 | 17.3 | 0 | 17.3 | 0.3 | 0.3 | 0 | 12.3 | 0 | 0 | 0 | 66.7 | 0.3 | 67.0 | 0.4 | 2.2 |
| | | | 13.7** | 1.0 | 8.3 | 0.7 | 5.7 | 0 | 0.3 | 0 | 15.7 | 0.3 | 0 | 0 | 43.7 | 2.0 | 45.7 | 4.4 | 4.1 |
| | | 2 | 24.3 | 3.0 | 9.6 | 1.0 | 2.8 | 1.3 | 0 | 0 | 16.6 | 0 | 0 | 0 | 53.3 | 5.3 | 58.6 | 9.0 | 85.5 |
| | | | 18.6 | 4.6 | 10.0 | 3.3 | 0.3 | 0.3 | 0 | 0 | 12.0 | 1.3 | 1.0 | 0 | 40.9 | 9.5 | 50.4 | 18.8 | 9.8 |
| | | 4 | 12.3 | 0.6 | 7.3 | 0.6 | 0.3 | 0.3 | 0 | 0 | 0 | 0 | 0 | 0 | 11.9 | 1.5 | 21.4 | 7.0 | 32.6 |
| | | | 9.3 | 0 | 8.0 | 1.3 | 0 | 0 | 0.6 | 0 | 0.6 | 1.6 | 0 | 0.3 | 18.5 | 3.2 | 21.7 | 14.7 | 4.9 |
| | | 6 | 12.0 | 3.0 | 3.6 | 3.3 | 0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16.2 | 6.3 | 22.5 | 28.0 | 87.5 |
| | | | 9.6 | 1.0 | 5.0 | 0.6 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | 0 | 14.6 | 1.9 | 16.5 | 11.5 | 2.5 |
| | 0.5 | 0 | 11.0 | 2.0 | 14.3 | 1.0 | 6.0 | 1.0 | 0 | 0 | 7.7 | 0 | 0 | 0 | 39.0 | 4.0 | 43.0 | 9.3 | 29.2 |
| | | | 4.0 | 2.3 | 4.7 | 0.3 | 0 | 0.3 | 0 | 0 | 4.3 | 6.3 | 0 | 0 | 13.0 | 9.2 | 22.2 | 41.4 | 18.7 |
| | | 2 | 28.0 | 13.3 | 8.3 | 3.6 | 1.3 | 0 | 0 | 0 | 5.3 | 3.0 | 0 | 0 | 42.9 | 19.9 | 62.8 | 31.7 | 288.4 |
| | | | 21.6 | 15.0 | 7.6 | 2.3 | 0 | 0.6 | 0 | 0 | 6.0 | 13.0 | 0 | 0.3 | 35.2 | 31.2 | 66.4 | 47.1 | 32.3 |
| | | 4 | 19.6 | 0.6 | 10.0 | 1.3 | 0.3 | 0 | 0 | 0 | 0.6 | 2.6 | 0 | 0 | 30.5 | 4.2 | 34.7 | 12.1 | 91.3 |
| | | | 36.6 | 6.6 | 10.3 | 6.0 | 0 | 0.6 | 0 | 0 | 0 | 3.0 | 0 | 0 | 46.9 | 16.2 | 63.1 | 25.7 | 25.2 |
| | | 6 | 7.3 | 1.6 | 3.6 | 1.0 | 0.6 | 0 | 0 | 0 | 0 | 1.0 | 0 | 0 | 11.5 | 3.6 | 15.1 | 23.8 | 50.0 |
| | | | 13.6 | 11.3 | 6.3 | 2.6 | 0 | 0 | 0 | 0 | 0 | 2.6 | 0 | 1.0 | 19.9 | 17.5 | 37.4 | 46.8 | 23.2 |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50% Cythion W. P. | 1.0 | 0 | 9.3 | 1.3 | 13.0 | 2.3 | 5.7 | 0.7 | 0 | 0 | 6.7 | 0 | 0 | 0 | 34.7 | 4.3 | 93.0 | 4.6 | 31.7 |
| | | | 9.7 | 0.7 | 7.0 | 1.3 | 3.0 | 0.3 | 0 | 0 | 5.3 | 1.0 | 0 | 0 | 25.0 | 3.3 | 28.3 | 11.7 | 6.7 |
| | | 2 | 7.0 | 2.3 | 12.0 | 0.3 | 2.3 | 0 | 0 | 0 | 0.5 | 0 | 0.6 | 0 | 22.4 | 2.6 | 25.0 | 10.4 | 41.9 |
| | | | 7.6 | 3.0 | 3.0 | 0.6 | 0.6 | 0 | 0 | 0 | 8.0 | 3.6 | 0 | 0 | 17.2 | 7.2 | 26.4 | 27.3 | 7.5 |
| | | 4 | 9.3 | 3.0 | 11.6 | 1.0 | 0.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21.2 | 4.0 | 25.2 | 15.9 | 86.9 |
| | | | 13.0 | 1.6 | 3.6 | 0.3 | 0.3 | 0.3 | 0 | 0 | 0 | 3.3 | 1.3 | 0 | 18.2 | 5.5 | 23.7 | 23.2 | 8.6 |
| | | 6 | 8.6 | 2.0 | 3.3 | 0.3 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0 | 0 | 11.9 | 2.6 | 14.5 | 17.9 | 36.1 |
| | | | 8.6 | 1.0 | 5.0 | 1.0 | 0.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13.9 | 2.0 | 15.9 | 12.6 | 2.5 |
| | 0.5 | 0 | 5.0 | 4.3 | 12.3 | 1.7 | 2.3 | 1.3 | 0 | 0 | 9.0 | 4.3 | 0 | 0 | 28.6 | 11.6 | 40.2 | 28.9 | 86.7 |
| | | | 10.7 | 2.3 | 6.3 | 1.7 | 1.3 | 0.7 | 0 | 0 | 5.0 | 2.7 | 0 | 0 | 23.3 | 7.4 | 30.7 | 24.1 | 15.1 |
| | | 2 | 12.0 | 8.6 | 6.0 | 6.6 | 2.3 | 0.6 | 0 | 0 | 3.3 | 0 | 1.0 | 0 | 24.6 | 9.8 | 34.4 | 28.5 | 158.1 |
| | | | 21.0 | 4.6 | 2.6 | 2.6 | 0 | 0.6 | 0 | 0 | 2.3 | 5.0 | 0 | 0 | 25.9 | 12.8 | 38.7 | 33.1 | 13.3 |
| | | 4 | 5.6 | 2.0 | 2.6 | 2.3 | 0.3 | 0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 8.5 | 4.9 | 13.4 | 36.6 | 106.5 |
| | | | 11.3 | 2.6 | 7.0 | 2.0 | 0.3 | 0 | 0 | 0 | 0.6 | 2.3 | 0 | 0 | 19.2 | 7.9 | 27.1 | 29.2 | 12.3 |
| | | 6 | 14.3 | 1.6 | 2.6 | 1.3 | 0 | 0.3 | 0 | 0 | 0 | 0 | 0 | 0 | 16.9 | 3.2 | 20.1 | 15.9 | 44.4 |
| | | | 18.3 | 3.6 | 5.0 | 0.6 | 0 | 0.3 | 0 | 0 | 0.3 | 1.0 | 0 | 0 | 23.6 | 5.5 | 29.1 | 18.9 | 7.3 |
| Check | — | 0 | 7.3 | 2.3 | 6.0 | 1.0 | 5.3 | 2.7 | 0 | 0 | 4.7 | 7.7 | 0 | 0 | 25.3 | 13.7 | 37.0 | 37.0 | 100.0 |
| | | | 16.0 | 35.7 | 6.7 | 6.7 | 2.0 | 2.7 | 0 | 0 | 8.3 | 4.0 | 0 | 0 | 33.0 | 49.1 | 82.1 | 59.8 | 100.0 |
| | | 2 | 12.3 | 3.6 | 7.3 | 1.0 | 2.0 | 1.3 | 0 | 0 | 7.3 | 0.3 | 0 | 0 | 28.9 | 6.2 | 35.1 | 17.7 | 100.0 |
| | | | 42.3 | 73.3 | 6.3 | 2.6 | 0.6 | 0.3 | 0 | 0 | 4.6 | 20.3 | 0 | 0 | 53.8 | 96.5 | 150.3 | 64.2 | 100.0 |
| | | 4 | 10.0 | 2.6 | 5.0 | 0.6 | 0.6 | 0.3 | 0 | 0 | 0 | 1.6 | 0 | 0 | 15.6 | 4.6 | 20.2 | 22.8 | 100.0 |
| | | | 89.3 | 37.6 | 12.0 | 8.6 | 0 | 3.0 | 0 | 0 | 0 | 14.0 | 0 | 1.0 | 101.3 | 64.2 | 165.5 | 38.8 | 100.0 |
| | | 6 | 17.3 | 3.3 | 2.3 | 1.0 | 1.0 | 2.6 | 0 | 0 | 0 | 0 | 0 | 0.3 | 20.6 | 7.2 | 27.8 | 25.9 | 100.0 |
| | | | 142.3 | 45.0 | 7.0 | 10.6 | 0.3 | 13.3 | 0 | 0 | 0 | 6.6 | 0 | 0 | 149.6 | 75.5 | 225.1 | 33.5 | 100.0 |

註：D代表死蟲，A代表活蟲。　*係袋外蟲數，**係袋內稻穀中蟲數。

1.二種藥劑對積穀害蟲之防治效果，雖以 Cythion作爲標準，在同樣有機成分含量（75% Gardona 1比75倍及150倍，而 50% Cythion 以1比50倍及100倍濃度），濾紙處理者，放入三種害蟲任其自由爬行接觸藥劑經48小時後，無論何種害蟲均致昏迷，但其接觸時間愈長死蟲率愈高。而高藥量均較低藥量之效力爲優。藥劑間相比較差異不大。（表1）。

2.藥劑噴佈於水泥表面者之效果， Gardona 較 Cythion 之效力更爲顯著， 即與濾紙處理之毒效比較，前者具有增强之趨勢，而後者反而降低，可能由於水泥吸收之影響所致。（表2）。

3.藥劑噴佈於蔴袋後，裝入無蟲稻穀放置室內常溫下貯藏者，埋入各種害蟲繁殖之稻穀中後，如此部分害蟲爬至處理組接觸藥劑後再爬到對照組而死亡，或因壽命限制亦有漸次死亡之可能，故對照組袋外與袋內之死蟲數較多，以致處理組與對照組之袋外附着活蟲差異不顯著，但其袋內之差異程度則極顯著。此二種藥劑對各種積穀害蟲之治蟲效力較相近似。其殘餘毒效以 Gardona 較 Cythion 稍長，可維持達4個月以上。（表3）。

## 四、結　論

本試驗爲明瞭 Gardona 對倉庫害蟲之防治效力，供推荐倉儲使用之依據。

二種藥劑對倉庫防治積穀害蟲之效力比較，分別用濾紙浸藥處理，其藥劑間之效力頗相近似。如藥劑噴佈於木箱內壁水泥表面者， Gardona 之效力較佳， Cythion 似有受水泥之影響， 致效力略爲降低。至於藥液噴佈蔴袋表面裝入稻穀者，與濾紙處理之效力頗爲一致，其殘餘毒效 Gardona 較 Cythion 稍爲長久，可維持4個月左右。

目前本省倉庫害蟲之防治，爲免日後發生害蟲對藥劑產生抗藥性，致失治蟲效力，應選擇較高濃度之 75% Gardona W.P. 稀釋1.25%爲宜。

## 五、參 考 文 獻

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# CHEMICAL CONTROL OF GRANARY INSECT PESTS IN TAIWAN (II)

by

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## Summary

This test was concducted at Taiwan Agricultural Research Institute to determine the effect of Gardona to granary insect pests. Cythion was also used with dipping method as standard chemical. It was found tbat the effect of these two chemicals are very similar.

However, Gardona showed better effect when it was sprayed on the interior walls of wooden box or on cement walls. The effect of Cythion was somewhat inferior to Gardona may be caused by cement wall. The results of chemicals sprayed on the jute bag were almost similar to that on the filter paper. As to the residual effect, Gardona also last longer than that of Cythion, the duration of its effectiveness almost extended as long as four months.